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PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

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[x] *Additional inventors are being named on the* 1 *separately numbered sheets attached hereto.*

TITLE OF THE INVENTION (280 characters max)

GAS EXPANSION TRUNK FOR MARINE VESSELS

Direct all correspondence to: **CORRESPONDENCE ADDRESS**

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ENCLOSED APPLICATION PARTS (*check all that apply*)

[X] Specification (includes drawings) *Number of Pages* 5 [ ] CD(s), Number

[X] Drawing(s) *Number of sheets* 1 [ ] Other (specify)

[ ] Application Data Sheet. See 37 CFR 1.76

METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT (check one)

[ ] Applicant claims small entity status. See 37 CFR 1.27.

[X] A check or money order is enclosed to cover the filing fees

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FILING FEE AMOUNT ($): $160.00

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

[X] No.

[ ] Yes, the name of the U.S. Government agency and the Government contract number are: _____

Respectfully submitted,

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Date July 17, 2003

REGISTRATION NO. *(if appropriate)* 25,928

Docket Number: 206,188

USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT

This collection of information is required by 37 CFR 1.51. The information is used by the public to file (and by the PTO to process) a provisional application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 8 hours to complete, including gathering, preparing, and submitting the complete provisional application to the PTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop Provisional Application, Assistant Commissioner for Patents Alexandria, VA 22313-1450.

PROVISIONAL APPLICATION COVER SHEET
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Docket Number	206,188	Type a plus sign (+) inside this box →	+

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AFS: 206,188

GAS EXPANSION TRUNK FOR MARINE VESSELS

Field of the Invention

The invention relates to the construction of marine vessels carry liquid cargos such as very large crude oil carriers ("VLCC"), and specifically to the requirements for providing cargo expansion space during transit.

Background of the Invention

MARPOL design requirements for marine vessels have substantially reduced the actual cubic capacity of tankers, in some cases by as much as 20%-30%. The double hull requirement of MARPOL Annex 1, 13F & G further reduce this capacity an additional 2% to 3%. See attached Table 1 entitled Double Hull Volume losses. Current regulations require a 2% head space in each tank of a vessel for expansion.

Tankers earn freight by the amount of liquid cargo they carry in weight, but oil is typically sold in volume. Thus, if a ship's internal volume, (referred to as "cubic capacity" or simply "capacity") is increased, the ship can earn increased freight income by the amount of weight the volume can accommodate. The increase in income can be calculated as cubic meters times specific gravity of cargo times freight rate in dollars.

Summary of the Invention

The internal volume or capacity of a vessel can be increased by transferring the 2% under-deck expansion of a typical ship's tank to an expansion trunk above the deck-head.

The purpose of the invention is to create a space for the liquid oil to expand and to allow "Topping Off" of the tanks at the ship's deck-head rather than 2% below it. Providing these expansion trunks puts the vessel in compliance with regulations, while increasing the cubic capacity of cargo, and thereby increasing revenue.

The expansion trunks of the invention are retro-fitted on top of existing tank ship's cargo tanks (or included as part of an original design for a new vessel). Each tank on the tanker is provided with its own expansion trunk located at the highest point and above the baseline of the ship, so that existing piping, so that existing piping, conduit and mooring equipment need not be moved or obstructed. In the preferred embodiment, the expansion trunk is located as far forward as possible in each tank because tankers typically load and transport cargo with a stern trim. Pipelines for tank venting and crude oil washing ("COW") are also retro-fitted if not incorporated into an original design embodying the invention.

The expansion trunk is constructed by cutting slots into, or "slotting" the existing deck plate and installing the expansion trunk around the slots. This allows the ship to increase its liquid carrying capacity by up to 2% or about 7000 tons on the 300,000 dwt ton tanker of 350,000+ cubic meters. A drawing illustrative of the invention is attached.

The expansion trunk frees the under deck expansion allowance which is typically 2% of each cargo tank, to be captured above the main deck. The amount of underdeck space for use as liquid cargo storage is thereby increased by 2%.

The expansion trunk is preferably made of the same material as the ship's deck, and is appropriately reinforced to withstand the force of the sea's impact on the structures. As will be apparent to one of ordinary skill in the art, the external configuration of these trunks can be curvilinear, or dome-shaped to reduce the lateral forces of waves impacting on their sides.

The trunks can be 10 to 40 meters in length by 5 to 15 meters wide by 2 to 3 meters high and be built directly on top of the existing deck of a tanker immediately above the tank it serves, thereby increasing each tank's liquid carrying capacity by between 100 and 1,800 cubic meters.

The deck plates enclosed by the expansion trunks are cut with sufficient slots to allow free communication between the existing tank and its associated superposed expansion trunk. The slots are cut between the deck longitudinals on sufficient deck plates enclosed by the expansion trunk according to the Classification Society rules that govern the ship's Stability and Trim rules. The size and arrangement of the slots is designed to minimize strength losses in the deck plate and are typically 2 to 3 cm wide by about 1/2 of the plate's length. Not every plate must be slotted, but sufficient slots are provided so that there is less than 0.5 psi difference between the opposing sides of the deck plate at 200% of the tank's maximum loading rate. As noted above, the expansion trunk and therefore the slots are preferably positioned as far forward as possible.

Existing venting via the ship's Inter Gas (IG) line and risers must be redirected so that the tank vents through the expansion trunk rather than through existing fittings. Additionally. crude oil washing piping and machines will have to be retrofitted in line with Classification Society requirements and the Trim and Stability Book will have to be re-calculated to include the added space and deck structures.

The invention can be utilized to greatest advantage on double hull tankers that have poor cubic capacities when compared to single hull tankers.

The design of the expansion trunks on existing tankers will to be done by constructing them above the tank in locations that avoid existing piping, conduit and structures and minimize any structural changes. This mode of construction will comply to the maximum extent possible with the requirements of the Classification Societies.

As will be apparent to one of ordinary skill in the art, the retrofitting or new construction of a vessel must comply with Classification Society rules for strength and stability. Each design alteration must be submitted to the ship's Classification Society for approval prior to installation. Although the regulations will not allow a vessel to carry a weight of cargo over and above the vessel's registered deadweight, the employment of the invention will allow loading of 100% of the vessel's existing registered deadweight.

Every new and existing tanker complying with MARPOL design regulations will gain lost volume as a result of practicing this invention. The benefits are added freight revenue as a result of having more space to load cargo. A 2% increase in carrying capacity of the existing world's tanker fleet will reduce the increase of the number of VLCC's required during the forthcoming decades and therefore reduce the environmental impact of the increasing number of tankers required to satisfy world demand for oil.

A further advantage of the invention is an increase in freight on every vessel, thus lowering he cost of delivering crude by about 2.5% or the equivalent of 50,000 barrels delivered free with each 2,000,000 barrels.

We claim:

1. A marine vessel having a plurality of separate liquid cargo tanks located below deck plate, a portion of the deck plate located above each tank being provided with a plurality of openings communicating with the tank below, and a separate expansion trunk secured in fluid-tight relation to the deckplate and surrounding the plurality of openings in the deck plate above each tank, to thereby form an expansion space to serve the cargo in the tank below.

2. The vessel of claim 1, where the expansion trunk is positioned above the forward portion of the tank.

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